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General Hubbard Model for Fermions in an Optical Lattice JASON KESTNER, LUMING DUAN, FOCUS center and MCTP, Department of Physics, University of Michigan — For two-component fermions in an optical lattice, an effective general Hubbard model (GHM) with tunable on-site attraction/repulsion and occupation-dependent hopping rates emerges from very general arguments [1]. This model is quite interesting, containing as special cases both the t-J and the XXZ models. However, the experimental range of applicability and the connection between the model parameters and the actual experimental parameters must be determined explicitly. To this end, we have used a stochastic variational approach with a correlated gaussian wavefunction to numerically find the eigenstates of two atoms interacting in a 3D few-well trap. By matching the few-site spectrum of the GHM to the variational spectrum obtained, the validity of the model and the relationship between experimental and model parameters are determined. [1] L.-M. Duan, Euro. Phys. Lett. 81, 20001 (2008).

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